Foot and Mouth Disease in the United Kingdom in 2001

This is example of how foot and mouth disease can spread in a country with a veterinary infrastructure similar to that of the United States and how the international community reacted to an outbreak in the U.K. Outbreaks of foot and mouth disease cause major economic and trading difficulties for infected countries. Because the disease can spread on fomites as well as between animals, it can sweep through a country rapidly in spite of control measures.

How it began

On February 19, 2001, a veterinary inspector from the State Veterinary Service of the Ministry of Agriculture, Fisheries and Food (MAFF), undertaking routine inspections at an abattoir at Little Warley near Brentwood, Essex, saw vesicular lesions on 27 sows and one boar. Vesicles (skin blisters) are a characteristic symptom of foot and mouth disease (FMD). Vesicles caused by FMD are clinically indistinguishable from those caused by other vesicular diseases such as vesicular stomatitis, swine vesicular disease, or vesicular exanthema of swine. In this case, laboratory tests confirmed the disease to be foot and mouth disease. On February 20, MAFF announced an immediate "stop movement" of all susceptible livestock in the United Kingdom, including the movement of animals to abattoirs, sale markets, and pastures.

Efforts to trace the disease back to the infected farm and suppress the outbreak began immediately. The infected pigs had arrived at the abattoir on February 16 from farms in Buckinghamshire and the Isle of Wight. The pigs were traced back to a farm at Heddon–on–the–wall, Northumberland. By the time the outbreak was discovered, foot and mouth disease had spread to a cluster of holdings in the County of Essex through the movement of pigs and people and local airborne spread. Infected sheep from the farm at Heddon–on–the–wall had also been moved to the Longtown market near Carlisle. These sheep infected thousands of additional sheep and cattle holdings in other parts of Great Britain, initially through the movement of sheep through markets and subsequently by local spread around infected holdings.

What is foot and mouth disease?

Foot and mouth disease is a highly infectious viral disease that can affect all cloven–hoofed animals including cattle, swine, deer, goats, and sheep. More rarely, it affects hedgehogs, rats, elephants, giraffes, and antelopes. The FMD virus is spread in aerosols and on fomites such as manure–contaminated tires, boots, and clothing. The disease is characterized by fever and vesicles, which progress to erosions in the mouth, nares, muzzle, feet, or teats. In cattle, oral lesions are common, with vesicles on the tongue, dental pad, gums, soft palate, nostrils, or muzzle. Hoof lesions can be found in the area of the coronary band and interdigital space. The erosions are quite painful and

affected animals are lame, refuse to eat, and may lose weight. The mouth lesions can cause profuse salivation. Sheep and goats show very mild, if any, signs. Animals generally recover in about two weeks but secondary infections may lead to a longer recovery time.

How it got into the U.K.

Seven immunogically different serotypes of the FMD virus are known to exist. The virus in the U.K. was identified as serotype "0" Pan–Asian. This strain was first recognized in India in 1990 and has since spread to a number of countries around the world. It is identical to the virus found in recent outbreaks in Africa, including one in South Africa where the virus was traced to pig swill – waste food from human tables – sold illegally from an Asian boat.

The source of the 2001 epizootic in the U.K. is also thought to have been pig swill. The feeding of pig swill is a practice that has been going on for generations. Today, pig swill comes from restaurants, schools, and anywhere humans eat and waste food on a large scale. In recent years, the feeding of pig swill has declined because it is thought to be inefficient and outmoded. In 1998, a government panel of agricultural experts advised that it be banned; however, the advice was rejected by ministers who did not want to impose new costs on hard–pressed farmers. Only about one percent of producers in the U.K. were using pig swill at the time of the outbreak. Farmers are supposed to treat the swill by heating it to 100 degrees centigrade to kill potential pathogens. MAFF officials suspect that the infectious swill originated as waste food from a ship or international restaurant that wasn't properly heat–treated.

The spread

By March 2, foot and mouth disease had spread to 40 locations, with many linked to infected markets. A total of 25,000 animals had been destroyed and incinerated on–farm. An outbreak was also confirmed in County Armagh in Northern Ireland. (The term "outbreak" used here refers to infections at a farm or abattoir that was previously uninfected.) On March 9, there were cases in 127 locations. The MAFF sent information to farmers and veterinarians on how to avoid spreading FMD and how to report suspected outbreaks. It also publicized the details of the clinical signs of FMD in sheep, as the symptoms in this species can be subtle.

At the start of the outbreak, MAFF veterinarians who had been on infected premises were required not to have contact with uninfected, susceptible animals for five days. A shortage of "clean" unexposed veterinarians quickly developed. Private practice veterinarians and foreign government veterinarians were enlisted to help with the outbreak. The U.S. sent the first group of 20 veterinarians the week of March 5. One month after the start of the outbreak, MAFF decreased the time required to become

"clean" from five to three days to enable more veterinarians to investigate potentially infected premises. Eventually the time required to become "clean" decreased to 24 hours to visit a highly suspect farm. Veterinary teams for infected premises, surveillance, and trace back from sale markets were established to better utilize personnel.

The control measures implemented by MAFF resulted in a number of difficulties. Because of the restriction of animal movement, cows could not cross roads for milking or be moved to fresh grazing pastures. Pregnant ewes were prevented from moving to shelter for lambing. There was a public outcry to allow some animal movement for welfare reasons. To reduce the transmission of virus by humans, footpaths in the countryside were closed and the public was strongly discouraged from going anywhere near livestock farms. Carcass disposal also became a problem. The MAFF initially planned to render the carcasses of destroyed livestock rather than incinerate them on–farm. However, the large number of carcasses resulted in a lack of sealed trucks for hauling carcasses to rendering plants, delays in burial, and shortages of material for incineration. The National Farmers Union (NFU) protested the delay of several days in destroying infected animals and burning carcasses. About one month after the start of the outbreak the military became involved in the outbreak, to coordinate the disposal of carcasses.

In spite of control measures, the epidemic continued to spread and cases began to appear outside the U.K. On March 13, FMD was confirmed at La Baroche–Gondouin in northwestern France. The infected farm was already in a movement control zone, put in place around a sheep farm that had imported sheep from the U.K. two weeks earlier. The sheep had been preventively slaughtered at that time. Six cattle on the farm showed symptoms of FMD, and the entire herd of 114 cattle was destroyed. On March 15, the MAFF made the decision to "ring depopulate" in the U.K. A ring was defined as three kilometers around an infected premises. A total of 251 farms were infected on March 15 and about a million healthy animals were scheduled to be killed. The media called it "the mass cull." On March 20, FMD was found in the Republic of Ireland; typical FMD lesions were detected in sheep on a farm only four miles away from the single outbreak which occurred in Northern Ireland. The farm was within the surveillance zone established after this earlier incident. The source of the Republic of Ireland outbreak was believed to be sheep imported via N. Ireland from mainland U.K.

On March 21, FMD was confirmed in four cows on a farm in the Netherlands. Temporary restrictions were imposed throughout the country on the movement of cattle, poultry, transport vehicles for cattle and poultry, and the semen, ova, and embryos of ungulates. All animals on the affected farm were immediately culled. The animals on the six farms within a one–kilometer radius of the infected holding were also destroyed.

Animals were either buried on the farm or burned. All farms within a radius of three kilometers of the affected farm were inspected for signs of FMD. The FMD virus is believed to have reached the Netherlands via a shipment of veal calves from the Republic of Ireland. The calves were rested in an animal holding near Barouche Gondouin, France for 12 hours, where they were apparently infected by sheep coming from the U.K. On March 23, to fight the spread of FMD, European Union veterinarians in Brussels agreed to limited emergency vaccination in the Netherlands around infected farms and animals awaiting slaughter. This overturned the 15–year E.U. policy of prohibiting vaccination for FMD.

On March 30, there were 60 new outbreaks in the U.K., the highest daily total of the epidemic so far, with a total of 839 outbreaks to that date. The farming and tourism industries had by this point been devastated, and even politics was affected. On April 2, Prime Minister Tony Blair announced that the general election scheduled for May 3 would be delayed until June 7 because of the FMD crisis. However, the severe control measures eventually succeeded in controlling the epidemic. By June 12 the spread had slowed; only four new locations were affected that day, bringing the total number of new outbreaks to 1,736. By this time, over 3,281,000 animals had been slaughtered, and 8,334 premises had been affected.

The international reaction

The U.K. was required to notify the World Organization for Animal Health (OIE) of the outbreak within 24 hours of the first case. On the following day, February 21, the European Commission banned the export of live animals, germplasm, fresh meat, meat products, milk and milk products, hides, and skins of FMD susceptible species from all of the U.K.

The U.S./USDA response

Immediately after FMD was confirmed in the U.K., the USDA stepped up its efforts to guard against FMD. The importation of swine, ruminants, any fresh swine or ruminant meat (chilled or frozen), and other products of swine and ruminant origin from the European Union was temporarily prohibited. Travelers were prevented from carrying into the U.S. any agricultural products, particularly animal products from the European Union that could spread the disease. Security was tightened at ports of entry and airports to ensure that passengers, luggage, and cargo were checked as appropriate. The USDA also heightened the alert and coordination with state agriculture officials and other USDA officials stationed around the globe to monitor the situation, and developed a public education campaign that included additional signs in airports, public service announcements, an information hotline, website, and other tools to inform the public about the issue. In addition, the U.S. sent a team of experts to the European Union to monitor, evaluate, and assist in containment efforts.

As the FMD outbreak grew in the U.K., the USDA also established an emergency operations center to coordinate communication, answer technical questions, and provide consumer and traveler information about FMD and other related issues. In addition, the USDA reviewed its current Animal and Plant Health Inspection Service programs and staffing to ensure appropriate resources were available to prevent the entry of FMD into the United States, both short and long–term. Federal and state emergency operations plans were also reviewed to ensure that appropriate response mechanisms were in place to act quickly if FMD were ever to enter the United States.

Final statistics

The last case of this outbreak was reported on September 30, 2001, bringing the total number of confirmed cases in the U.K. to 2,030. Many more animals had been killed to prevent the spread of the disease. According to official U.K. government figures, 4,068,000 animals were culled between the first case on February 20, 2001 and the last case on September 30, 2001. Unofficial figures from the Meat and Livestock Commission put the number of animals slaughtered at more than 10 million. Those figures include animals slaughtered for welfare reasons such as dwindling feed and space, animals killed because there was no market for them, and animals killed with their mothers and only counted as one animal. On January 22, 2002, the OIE declared that the U.K. had regained its previously recognized FMD–free status without vaccination, clearing the way for international export trade in animals and animal products.

FMD occurred in Uruguay at about the same time as in the U.K. The UK and Uruguay have a similar population of cattle (the UK has more sheep and pigs), and the two countries both had over 2,000 outbreaks. But the procedures the two countries used to address FMD were drastically different. Uruguay slaughtered 6,900 animals and used 24 million doses of vaccine. Both outbreaks lasted about the same amount of time. The cost of the outbreak in Uruguay was $13 million, with $7.5 million for vaccine and the remainder on compensation payments to farmers, cleaning and disinfection and operating expenses.

Sources of Information

http://www.aphis.usda.gov:80/oa/fmd/informwp.html

http://www.defra.gov.uk/footandmouth/

http://www.pighealth.com

http://www.promedmail.org/pls/promed/promed.home